WHAT IS CLAIMED IS:

1.   A method comprising:
phase modulating an Asynchronous Transfer Mode (ATM) signal based on an
      Internet Protocol (IP) signal to form a combined ATM/IP signal.

2.   The method of claim 1 wherein said phase modulating comprises phase
modulating the ATM signal based on the IP signal without exceeding a specified
tolerance of symbol period of the ATM signal.

3.   The method of claim 1 wherein said phase modulating encodes multiple
bits of the IP signal per pulse in the ATM signal.

4.   The method of claim 1 wherein said phase modulating encodes two bits of
the IP signal per pulse in the ATM signal.

5.   The method of claim 1 further comprising:
communicating the combined ATM/IP signal on an ATM-based network;
receiving the combined ATM/IP signal via the ATM-based network; and
phase demodulating the combined ATM/IP signal to extract the IP signal.

6.   The method of claim 1 wherein the ATM-based network comprises a
G.983-based network.

7.   The method of claim 1 further comprising:

communicated the combined ATM/IP signal to multiple locations including a first
location and a second location;

receiving the combined ATM/IP signal at the first location;

extracting, at the first location, an ATM stream specific to the first location from
the combined ATM/IP signal;

receiving the combined ATM/IP signal at the second location; and

phase demodulating the combined ATM/IP signal at the second location to extract
an IP stream.

8.   The method of claim 7 wherein the combined ATM/IP signal is
communicated via a passive optical network to the multiple locations.

9.   A method of upgrading an embedded Asynchronous Transfer Mode (ATM)-based passive optical network (PON) having a plurality of existing ATM-based optical network terminals (ONTs), the method comprising:

> upgrading an optical line terminal (OLT) to comprise a phase modulator to modulate a phase of an ATM signal based on an Internet Protocol (IP) signal;

> replacing at least one of the existing ATM-based ONTs with an IP-based ONT having a phase demodulator;

> generating, at the OLT, a combined ATM/IP signal by phase modulating the ATM signal based on the IP signal;

> communicating the combined ATM/IP signal to multiple locations via the PON;

> receiving the combined ATM/IP signal at one or more ATM locations having an existing ATM-based ONT;

> extracting, at each of the ATM locations, a respective ATM stream specific to the location from the combined ATM/IP signal using its existing ATM-based ONT;

> receiving the combined ATM/IP signal at one or more IP locations having an IP-based ONT; and

> extracting, at each of the IP locations, an IP stream by phase demodulating the combined ATM/IP signal.

10.   The method of claim 9 wherein said phase modulating comprises phase modulating the ATM signal based on the IP signal without exceeding a specified tolerance of symbol period of the ATM signal.

11.   The method of claim 9 wherein said phase modulating encodes two bits of the IP signal per pulse in the ATM signal.

12.   An optical network terminal (ONT) comprising:

a phase demodulator to phase demodulate a combined Asyncrhonous Transfer

Mode (ATM)/Internet Protocol (IP) signal to extract an IP stream.

13.   The ONT of claim 12 wherein the phase demodulator is to decode multiple bits of the IP stream per pulse in the combined ATM/IP signal.

14.   The ONT of claim 12 wherein the phase demodulator is to decode two bits of the IP stream per pulse in the combined ATM/IP signal.

15.   An optical line terminal (OLT) comprising:

a phase modulator to phase modulate an Asynchronous Transfer Mode (ATM)

signal based on an Internet Protocol (IP) signal to form a combined

ATM/IP signal.

16.   The OLT of claim 15 wherein the phase modulator is to phase modulate the ATM signal based on the IP signal without exceeding a specified tolerance of symbol period of the ATM signal.

17.   The OLT of claim 15 wherein the phase modulator encodes multiple bits of the IP signal per pulse in the ATM signal.

18.   The OLT of claim 15 wherein the phase modulator encodes two bits of the IP signal per pulse in the ATM signal.